

IOWA DEPARTMENT OF TRANSPORTATION

To Office: Specification Committee **Date:** August 29, 2016
Attention: **Ref. No.:** 305
From: Thomas L. Reis, P.E.
Office: Specifications
Subject: Agenda for September 8, 2016, Specification Committee Meeting

The Specification Committee will meet on Thursday, September 8, 2016, at 9:00 a.m. in the NW Wing, 1st Floor Conference Room.

The agenda is as follows:

1. Article 2316.02, A, 6, b, Smoothness Requirements.

The Office of Construction and Materials requests to clarify the smoothness requirements for matching existing pavement lanes.

2. Article 2433.03, L, Test Shaft.

The Office of Construction and Materials requests to require a cylinder test on the day of the load cell test.

3. Section 2513, Concrete Barrier.

The Office of Construction and Materials requests to allow the use of micro fibers in barrier rail concrete.

4. DS-15016, Small Business Development Contracts.

The Offices of Employee Services and Contracts request updates to the Developmental Specifications for Small Business Development Contracts.

5. DS-15XXX, Primary and Interstate Pavement Smoothness.

The Office of Construction and Materials requests approval of Developmental Specifications for Primary and Interstate Pavement Smoothness.

6. Rental Rate Blue Book name change.

The name of the Rental Rate Blue Book will be changed to Equipment Watch Cost Recovery. This change will be reflected in Article 1109.03, B, 2, g of the Standard Specifications. This also affects Chapter 2 of the Construction Manual.



SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Greg Mulder		Office: Construction and Materials	Item 1
Submittal Date: July 2016		Proposed Effective Date: April, 2017	
Article No.: 2316.02, A, 6, b		Other:	
Title: Smoothness Requirements			
Specification Committee Action:			
Deferred:	Not Approved:	Approved Date:	Effective Date:
Specification Committee Approved Text:			
Comments:			
Specification Section Recommended Text:			
2316.02, A, 6, b.			
Replace the Article:			
For through traffic lanes wider than 8.5 feet which requires matching the surface of the new pavement to the surface of an existing old pavement, the price reduction tables for Schedule A and B will be replaced by Schedule C. When the Profile Index is greater than 7.0 inches for schedule A segments or 22.0 inches per mile for Schedule B segments, calculate an Average Base Index (ABI) will be calculated for each segment as shown in Table 2316.02-1 on lanes wider than 8.5 feet. This will be the smoothness base in inches per mile for payment for the new pavement unless specified otherwise. The requirements are shown in Schedule C.			
Comments:			
<p>6. Smoothness Requirements:</p> <p>a. Apply Table 2316.02-1 to all projects when specified. Smoothness requirements in inches per mile (millimeters per kilometer) are listed in Schedules A and B.</p> <p>b. For through traffic lanes wider than 8.5 feet (2.6 m) which requires matching the surface of the new pavement to the surface of an existing old pavement, the price reduction tables for Schedule A and B will be replaced by Schedule C. When the Profile Index is greater than 7.0 inches for schedule A segments or 22.0 inches per mile for Schedule B segments, calculate an Average Base Index (ABI) will be calculated for each segment as shown in Table 2316.02-1 on lanes wider than 8.5 feet (2.6 m). This will be the smoothness base in inches per mile (millimeters per kilometer) for payment for the new pavement unless specified otherwise. The requirements are shown in Schedule C.</p>			
Reason for Revision: In some cases on added lanes, contractors can achieve smoothness levels that qualify for incentive. The current language is a little vague. The original intent of schedule C was to provide a more realistic disincentive table when matching a rough existing pavement. It wasn't intended to eliminate schedule A or B incentives if deserved.			
New Bid Item Required (X one)	Yes	No X	
Bid Item Modification Required (X one)	Yes	No X	
Bid Item Obsolescence Required (X one)	Yes	No X	
Comments:			
County or City Comments:			
Industry Comments:			



SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Greg Mulder / Neal Fobian		Office: Construction & Materials		Item 2
Submittal Date: 09/08/2016		Proposed Effective Date: April 2017		
Article No.: 2433.03, L. Title: Test Shaft		Other:		
Specification Committee Action:				
Deferred:	Not Approved:	Approved Date:	Effective Date:	
Specification Committee Approved Text:				
Comments:				
Specification Section Recommended Text: 2433.03, L, 1, b, 4. Add to the end of the Article: Concrete strength will be determined based on a cylinder test the day of the load cell test.				
Comments:				
Member's Requested Change: (Do not use 'Track Changes', or 'Mark-Up'. Use Strikeout and Highlight.) Add sentence to Article 2433.03.L.1.b.4. 4) After the CSL test has been approved and the concrete has reached a minimum required strength of 3500 psi, internally pressurize the load cell creating an upward force on the shaft and an equal, but downward force. The total load for a given internal pressure is found from the load cell's calibration. Ensure this is performed prior to load cell's shipment to the site. During the period required to perform the load cell test, no casings may be vibrated into place or steel piles installed within 200 feet of the load test. Concrete strength will be determined based on a cylinder test the day of the load cell test.				
Reason for Revision: The firm performing the load test requires this information for their analysis and inclusion in report.				
New Bid Item Required (X one)	Yes	No X		
Bid Item Modification Required (X one)	Yes	No X		
Bid Item Obsolescence Required (X one)	Yes	No X		
Comments:				
County or City Comments:				
Industry Comments:				



SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Greg Mulder		Office: Construction & Materials	Item 3
Submittal Date: 2016.08.23		Proposed Effective Date: April 2017	
Section No.: 2513		Other:	
Title: Concrete Barrier			
Specification Committee Action:			
Deferred:	Not Approved:	Approved Date:	Effective Date:
Specification Committee Approved Text:			
Comments:			
Specification Section Recommended Text: 2513.02, Materials. Add the Article: G. Micro Fibers. Use 100% virgin polypropylene, fibrillated fibers complying with Materials IM 491.27. 2513.03, A, 2, b. Add the Article: 5) Micro Fibers. Use synthetic fibers at addition rate and batching according to manufacturer's recommendations. Use addition rate of 1.5 pounds per cubic yard, in lieu of manufacturer's recommended rate.			
Comments:			
Member's Requested Change: (Do not use 'Track Changes', or 'Mark-Up'. Use Strikeout and Highlight.) 2513.02 MATERIALS. G. Micro Fibers. Use 100% virgin polypropylene, fibrillated fibers complying with Materials IM 491.27. 2513.03 CONSTRUCTION. 2. Cast-in-Place and Slip Form. a. For cast-in-place, use Class C concrete complying with Materials I.M. 529 . For slip form, use Class BR complying with Materials I.M. 529 . b. Submit Class BR mix design to the District Materials Engineer for approval at least 7 calendar days prior to placement. Apply Section 2403, except meet the following mix design requirements: 6) Micro Fibers. Use synthetic fibers at addition rate and batching according to manufacturer's recommendations. Use addition rate of 1.5 lbs. per cubic yard, in lieu of manufacturer's recommended rate.			
Reason for Revision: A contractor has performed trials on several projects using fibrillated fibers to improve placement. The trials have done well and the contractor and DME's have requested addition to the specification.			
New Bid Item Required (X one)	Yes	No X	
Bid Item Modification Required (X one)	Yes	No X	
Bid Item Obsolescence Required (X one)	Yes	No X	

Comments:
County or City Comments:
Industry Comments:



SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Jacqui DiGiacinto Miskimins / Wes Musgrove		Office: Employee Services / Contracts	Item 4
Submittal Date: 07/01/2016		Proposed Effective Date: November 15, 2016	
Article No.: Title:		Other: DS-15045, Developmental Specifications for Small Business Development Contracts	
Specification Committee Action:			
Deferred:	Not Approved:	Approved Date:	Effective Date:
Specification Committee Approved Text:			
Comments:			
Specification Section Recommended Text: See attached Developmental Specifications for Small Business Development Contracts.			
Comments:			
Member's Requested Change: (Do not use 'Track Changes', or 'Mark-Up'. Use Strikeout and Highlight.) See attached.			
<p>Reason for Revision: Previous version of the program utilized state dollars and is now using federal dollars; therefore the federal definition of a small business must be used. The DS must be updated to reflect the definition as described by SBA.</p> <ol style="list-style-type: none"> 1. Eliminate the manual process of verifying that only small business certified subcontractors are used. 2. Allow more flexibility for small business primes to select subcontractors. For example, there is currently only one small business certified traffic control contractor, which is very limiting for small business primes. 3. Small business contracts are occasionally used to satisfy a component of the Federal DBE Program. The certified small business prime will still be required to self-perform at least 30% of the contract. Federal requirements, when applicable, will still be satisfied. 			
New Bid Item Required (X one)	Yes	No X	
Bid Item Modification Required (X one)	Yes	No X	
Bid Item Obsolescence Required (X one)	Yes	No X	
Comments:			
County or City Comments:			
Industry Comments:			



**DEVELOPMENTAL SPECIFICATIONS
FOR
SMALL BUSINESS DEVELOPMENT CONTRACTS**

**Effective Date
November 15, 2016**

THE STANDARD SPECIFICATIONS, SERIES 2015, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE DEVELOPMENTAL SPECIFICATIONS AND THEY SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

15XXX.01 DESCRIPTION.

The intent of this specification is for the Department to comply with Iowa Code 314.14 49 CFR 26.39 by providing contracts where only small businesses compete against each other, and not against large established contractors fostering small business participation.

15XXX.02 DEFINITIONS.

Certified Small Business Contractors (CSBC) – A contractor who has been recognized as meeting the requirements of a Small Business contractor by the Iowa DOT's Office of Employee Services - Civil Rights Section.

Prequalification – Submittal of a Contractors Financial-Equipment-Experience (FEE) Statement as described in Article 1102.01 of the Standard Specifications

Small Business – A firm which meets the requirement of Iowa Code 314.14 which defines a "Small business" as any enterprise which is operated for profit, under a single management, and which has either fewer than twenty employees or an annual gross income of less than four million dollars computed as the average of the three preceding fiscal years, US Small Business Administration (SBA) regulations at 13 CFR Part 121, as amended. Size standards for each applicant shall be determined by identifying the firm's primary area(s) of work, locating the related North American Industry Classification System (NAICS) code(s) and applying the corresponding SBA size standard.

Small Business Certification – A document completed by a small business and submitted to the Iowa DOT's Office of Employee Services - Civil Rights Section certifying the firm complies with the size requirements of the Iowa Code 314.14 Small Business requirements, SBA regulations at 13 CFR Part 121, as amended. The Department may require the small business to provide additional proof of eligibility to verify the requirements of Iowa Code 314.14 the SBA definition of a small business are not exceeded.

Targeted Small Business (TSB) – Iowa Code 15.102 paragraph 7a defines a "Targeted small business" as a small business which is 51% or more owned, operated, and actively managed by one or more women, minority persons, or persons with a disability.

TSB Bond Waiver – Iowa Code 12.44 requires agencies of state government to waive the requirement of satisfaction, performance, surety, or bid bonds for targeted small businesses which are able to demonstrate the inability of securing such a bond because of a lack of experience, lack of net worth, or lack of capital. This waiver will not apply to businesses with a record of repeated failure of substantial performance or material breach of contract in prior circumstances. The waiver will only be applied to a project or individual transaction amounting to fifty thousand dollars or less, notwithstanding Iowa Code 573.2. In order to qualify, the TSB shall provide written evidence to the Department of inspections and

appeals that the bond would otherwise be denied the business. The granting of the waiver will in no way relieve the business from its contractual obligations and will not preclude the Department from pursuing any remedies under law upon default or breach of contract. The Department of inspections and appeals will certify TSBs for eligibility and participation in this program and will make this information available to other state agencies.

15XXX.03 BIDDING FOR CONTRACTS.

- A.** Only firms designated as approved Certified Small Business Contractors (CSBCs) by the Department will be allowed to bid on proposals designated for Small Business Contractors. A CSBC wishing to bid on a proposal designated for Small Business Contractors shall submit a written request to bid using the standard Iowa DOT procedures to be approved to bid on a proposal. The Department will give either written approval or denial of each request. Prequalification by the Department is not required, but the Department may require a CSBC to provide references or examples of similar types of work in order to be approved for bidding on individual proposals.
- B.** Prior to execution of a contract, the CSBC will be required to provide:
 - 1.** A Certificate of Insurance (as required by Article 1103.04 of the Standard Specifications) and
 - 2.** For contracts exceeding \$25,000, either a Performance Bond (as required by Article 1103.05 of the Standard Specifications) or a TSB Bond Waiver.
- C.** A Traffic Control Technician according to Article 2528.01, C, 1, of the Standard Specifications is not required for this contract.

15XXX.04 CONSTRUCTION OF THE WORK.

- A.** Article 1108.01 of the Standard Specifications allows a contractor to subcontract up to 70% of the contract amount. ~~On contracts designated for CSBCs the Contractor may subcontract 70% of the contract amount, but this work shall only be subcontracted to another CSBC.~~
- B.** While the Department recognizes that a small business may not have all the equipment and resources of larger contractors, all requirements of the contract documents shall apply to the CSBC.

15XXX.05 PAYMENT FOR WORK.

Payment for work will be according to Article 1109.05 of the Standard Specifications.



SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Greg Mulder		Office: Construction and Materials	Item 5
Submittal Date: 2016.08.23		Proposed Effective Date: December 20, 2016	
Article No.: Title:		Other: DS-15XXX, Developmental Specifications for Primary and Interstate Pavement Smoothness	
Specification Committee Action:			
Deferred:	Not Approved:	Approved Date:	Effective Date:
Specification Committee Approved Text:			
Comments:			
Specification Section Recommended Text: See attached Draft Developmental Specifications for Primary and Interstate Pavement Smoothness.			
Comments:			
Member's Requested Change: (Do not use 'Track Changes', or 'Mark-Up'. Use Strikeout and Highlight.) See Attached.			
Reason for Revision: The International Roughness Index measure for construction pavement smoothness assessment is a better measure of ride quality than the profilograph profile index. The DS will be used to pilot the new specification on 3 to 5 projects in 2017. Based on the experiences from 2017, further refinements will be made to the DS for use on several projects in 2018.			
New Bid Item Required (X one)	Yes	No X	
Bid Item Modification Required (X one)	Yes	No X	
Bid Item Obsolescence Required (X one)	Yes	No X	
Comments:			
County or City Comments:			
Industry Comments:			



**DEVELOPMENTAL SPECIFICATIONS
FOR
PRIMARY AND INTERSTATE PAVEMENT SMOOTHNESS**

**Effective Date
December 20, 2016**

THE STANDARD SPECIFICATIONS, SERIES 2015, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE DEVELOPMENTAL SPECIFICATIONS AND THEY SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

These specifications replace Section 2317 of the Standard Specifications.

2317.01 GENERAL.

Evaluate pavement smoothness for Interstate and Primary main line pavement surfaces, and other road surfaces included on Primary projects, except when specifically excluded or modified by the contract documents. Main line pavement is defined as permanent pavement for through lanes.

- A.** The index used for determining the pavement smoothness is the Mean Roughness Index (MRI) per segment as determined by the latest version of the FHWA's software, ProVAL.
- B.** The other measure of pavement smoothness is the Area of Localized Roughness (ALR) based on a continuous MRI computed over a 25 foot distance as determined by the latest version of ProVAL.
- C.** A pavement segment is defined as a continuous area of finished pavement 0.1 mile in length and one lane (10 to 12 foot nominal) in width. A partial segment may result from an interruption of the continuous pavement surface (in other words, bridge approaches, side road tie-ins, the completion of the daily paving operations, and so forth). Pay adjustments will be prorated for partial segments. If a segment is less than 100 feet in length and requires corrective work, the Engineer will waive the corrective work requirement for the segment and instead assess a prorated disincentive. The Contracting Authority will subject the segment to ALR correction in accordance with Table 2317.05-1

2317.02 EQUIPMENT.

- A.** Provide and operate an inertial profiler meeting the requirements of AASHTO M 328 and Materials IM 341, Appendix A. Ensure operator is trained and certified to operate profiler as required by the Contracting Authority.
- B.** For corrective work by diamond grinding, use grinding and texturing equipment meeting the requirements of Section 2532 of the Standard Specifications.

2317.03 TESTING AND EVALUATION.

A. Testing.

- 1.** Obtain profiles of both wheel paths for each lane according to procedures shown in Materials IM 341, Appendix A. Wheel paths are defined as 3 feet and 9 feet from the center line or lane line. Average the two wheel path profile indexes for each segment.

2. The Engineer may use an inertial profiler, 10 foot straightedge, or other means to detect irregularities in excluded surface areas or areas outside the required wheel paths for required corrective action.
3. Test bridge approaches according to Section 2428 of the Standard Specifications.
4. Test pavement within 5 working days of completion of paving.
5. Paved shoulders will be excluded from smoothness testing. When used as a temporary driving surface, evaluate paved shoulders for ALR. Take corrective action for ALR greater than 250.0 inches/ mile.

B. Evaluation.

1. Determine a MRI using the latest version of the ProVAL "Ride Quality" analysis and following procedures shown in Materials IM 241, Appendix A for each segment of finished pavement surface with a posted speed over 45 mph except for:
 - a. Roads intersecting the mainline pavement less than 600 feet in length.
 - b. Road connections 150 feet before an intersection that end at a stop sign (or a yield sign at roundabouts).
 - c. 20 feet on either side of bridges, bridge approaches, existing EF joints, manholes, or water valve boxes in the lane that the obstruction is located.
 - d. Ramps and loops.
 - e. Bridge approaches (evaluated according to Section 2428 of the Standard Specifications).
 - f. Storage lanes, turn lanes, and other auxiliary lanes less than 1000 feet.
 - g. Pavement less than 8.5 feet in width.
 - h. Single lift pavement overlays 2 inches thick or less, unless the existing surface has been corrected by milling or scarification.
 - i. Single lift pavement overlays 2 inches thick or less placed directly on PCC pavement.
 - j. Paved shoulders.
 - k. Detour pavement.
 - l. Crossovers.
 - m. Individual sections of pavement less than 100 feet in length.
2. Determine ALR using the latest version of the ProVAL "Smoothness Assurance" analysis and following the procedures shown in Materials IM 341, Appendix A for each segment of finished pavement surface with a posted or advisory speed over 35 mph except for:
 - a. Side road connections 150 feet before an intersection that end at a stop sign (or a yield sign at roundabouts).
 - b. Twenty feet on either side of bridges, bridge approaches, manholes, or water valve boxes in the lane that the obstruction is located.
 - c. Bridge approaches (evaluated according to Section 2428 of the Standard Specifications).
 - d. Pavement less than 8.5 feet in width.
 - e. Paved shoulders (unless used as a temporary driving surface).
 - f. Detour pavement.
 - g. Crossovers.
 - h. Individual sections of pavement less than 50 feet in length.
3. The Engineer may determine and identify irregularities of 1/8 inch or more in 10 feet longitudinally for excluded surface areas or areas outside the required wheel paths.
4. Submit final profile summary sheets to the Engineer within 14 calendar days following completion of paving on the project. When the testing is done at the completion of paving on the project, provide the Engineer the ProVal files along with the profile summary sheets.

2317.04 CORRECTIVE ACTIONS.

A. General.

1. Pavement will be evaluated in 0.1 mile segments using inertial profiler, to determine pavement segments where corrective work or pay adjustments will be necessary.
2. Within each 0.1 mile segment, correct ALR greater than 250.0 Inches/mile regardless of MRI value. Take corrective action.
3. Separately identify ALR.
4. On lanes over 8.5 feet in width, for through traffic which requires matching the surface of new pavement to the surface of an existing pavement, determine MRI and ALR for the existing lane. Compare MRI values and ALR areas according to Materials IM, Appendix A. If MRI and ALR for new pavement are less than the MRI and ALR for the existing surface, no negative payment adjustment or correction for MRI or ALR will be required.

B. MRI Correction.

Correct 0.1 mile segments having an initial MRI greater than those tolerances shown in Article 2317.05. Correct these segments to reduce MRI to that shown in Tables 2317.05-2 and 2317.05-3. Contractor has the option to replace these segments. On segments where corrections are made, test entire 0.1 mile segment of pavement to verify that corrections have met the MRI as shown in Tables 2317.05-2 and 2317.05-3.

C. ALR Correction.

Correct ALR greater than those tolerances shown in Article 2317.05. Correct these segments to reduce the ALR to that shown in Table 2317.05-1. Contractor has the option to replace these areas. On segments where corrections are made, test entire 0.1 mile segment of pavement to verify corrections have met ALR level shown in Table 2317.05-1.

D. Engineer Identified Irregularities.

Correct areas over 1/8 inch in 10 feet identified by the Engineer.

E. Bridge Approach Sections.

Correct bridge approach sections according to Section 2428 of the Standard Specifications.

F. Corrective Work.

When Contractor is not responsible for adjoining surface, ALR in the 20 feet at the end of a section will be reviewed by the Engineer. Correct ALR determined to be under the control of the Contractor and resulting from Contractor's operations. Correction of ALR determined to be beyond control of Contractor will be paid according to Article 1109.03, B of the Standard Specifications. Complete corrective work prior to determining pavement thickness. Do not use bush hammers or other impact devices.

1. PCC Pavement.

Make corrections using an approved profiling device or by removing and replacing pavement. Apply corrective methods to full lane width. Ensure, when completed, corrected area (full lane width) has uniform texture and appearance, with the beginning and ending of the corrected area squared normal to centerline of paved surface. Where surface corrections are made, grooving will not be required.

2. HMA Pavement.

- a. Make corrections by diamond grinding, overlaying, replacing, or inlaying the area. If surface is corrected by diamond grinding, perform the same work and use the same equipment as specified for PCC pavement.
- b. If surface is corrected by overlay, replacement, or inlay, begin and end surface correction with a transverse saw cut normal to pavement lane lines or edge lines within any one area. Profile of the surface shall be smooth with no bumps or dips at beginning or end of correction.
- c. Overlay correction shall be for entire pavement width. Pavement cross slope shall be maintained through corrected areas.

G. Verification Testing.

1. Engineer will perform verification testing to validate Contractor's certified quality control testing. If the Engineer's verification test results validate Contractor's test results, the Contractor's results will be used for acceptance. Disputes between Contractor's and Engineer's test results will be resolved according to Materials IM 241, Appendix A.
2. Engineer may test entire project length if it is determined the Contractor's certified test results are inaccurate. Contractor will be charged for this work at a rate of \$800.00 per lane-mile, with a minimum charge of \$1500.00.
3. Furnishing inaccurate tests may result in decertification of Contractor's certified operator.

2317.05 PAY ADJUSTMENTS.

A. General.

1. Pay adjustments will be based on initial MRI determined for the segments prior to performing any corrective work. Areas excluded from Inertial profiler testing and bridges approaches will not be subject to price adjustments.
2. If Contractor elects to remove and replace segments, Contractor will be paid the price adjustment that corresponds to the initial index obtained on the pavement segments after replacement.
3. When the plans indicate an area of pavement shall be hand finished, the area will not be subject to reduced payment. However, the area shall be profiled and corrected as necessary to meet these specifications.

B. Areas of Localized Roughness.

Payment for areas of localized roughness will be adjusted as shown in Table 2317.05-1.

Table 2317.05-1: Schedule for Adjustment Payment for Areas of Localized Roughness

ALR in 25 Foot Continuous Mean International Roughness Index (MRI) Inches per mile	Dollars per foot of pavement length per lane
200.0 to 250.0	-30.00 or grind*
Greater than 250.0	Grind*

*Correct these areas to below 200.0 inches per mile

C. PCC Pavement.

Payment for mean International Roughness Index for PCC pavement will be adjusted as shown in Table 2317.05-2.

Table 2317.05-2: Schedule for Adjustment Payment for PCC Pavements

Mean International Roughness Index (MRI) Inches per mile	Dollars per 0.1 mile segment per lane
Less than 55.0	1500.00
55.0 to 63.0	$11812.5 - 187.5 \times \text{MRI}$
63.0 to 75.0	0.00
75.0 to 90.0	$7500 - 100 \times \text{MRI}$ or grind*
Greater than 90.0	Grind*

*Correct these areas to below 75.0 inches per mile

D. HMA Pavement.

The payment for mean International Roughness Index for HMA pavement will be adjusted as shown in Table 2317.05-3.

**Table 2317.05-3: Schedule for Adjustment Payment for
HMA Pavements**

Mean International Roughness Index (MRI) Inches per mile	Dollars per 0.1 mile segment per lane
Less than 30.0	1500.00
30.0 to 39.0	$6500 - 166.6667 \times \text{MRI}$
39.0 to 75.0	0.00
75.0 to 90.0	$7500 - 100 \times \text{MRI}$ or grind*
Greater than 90.0	Grind*

*Correct these areas to below 75.0 inches per mile

Appendix A
DETERMINING PAVEMENT RIDE QUALITY

SCOPE

This IM describes procedures used to perform smoothness testing on new pavements surfaces. A certified person is required to perform the testing, evaluation, and reporting.

PROCEDURE

A. Apparatus

1. Inertial Profiler meeting requirements of AASHTO M 328 (this requires an auto start/stop) and currently certified on the Iowa DOT test strips or other state test strips approved by the Iowa DOT. For surfaces other than dense graded HMA, a large footprint laser is required.
2. Ten-foot straight edge or a 10-foot straight edge software simulation.
3. Distance measuring wheel or tape.
4. Latest version of ProVAL software. <http://www.roadprofile.com/proval-software/current-version/>
5. Latest version of the Iowa DOT Spreadsheet, Profile Summary Sheet.
http://www.iowadot.gov/Construction_Materials/materials_forms.html

B. Profiler Approval

1. Profilers shall be checked and approved by the Iowa DOT Materials Laboratory before each construction season for proper operation. Profilers checked and approved in another state in the current year may be approved. Submit a request to Special Investigations Engineer for consideration of approval.
2. ProVAL will be used to analyze the profiler files. The criteria for approval includes:
 - a) High pass and low pass filters set to 0. All other settings according to manufacturer's recommendation (The settings used for approval will be the same used throughout the season).
 - b) Submittal of 5 good runs of the test strip as ERD files.
 - c) The DMI distance shall be within 0.15% of the actual test strip distance.
 - d) The equipment repeatability score with the IRI filter shall be 0.90 or greater.
 - e) The equipment accuracy score with the IRI filter shall be 0.88 or greater when compared to the reference profiler.
 - f) The average IRI shall be within 5% of the reference profiler IRI.

C. Calibration and Verifications

Checks, calibrations, and verification of subsystems vary by manufacturer. Follow the manufacturer's recommended procedures and frequencies to ensure proper profile collection.

D. Test Procedure

1. The contractor (or sub-contractor) responsible for smoothness testing shall give the Project Engineer and the District Materials Engineer 48 hour notice prior to testing so the District Materials Office may provide verification testing.
2. Dirt and debris may affect collection of the profile. Excessive mud or caked mud must be removed prior to testing. A grader blade or power broom will knock concrete crumbs off longitudinal or transverse grooving.
3. Perform the warm up and checks of the profiler.
 - a) For most profilers, the tire pressures should be maintained at the same pressures as when the distance was last calibrated.
 - b) It is advisable to do a bounce test and vertical height test on the sensors before beginning testing.
4. Ensure computer settings are the same as when the unit was approved by the Department. The high-pass and low pass filter settings should be "0".
5. Test in the direction of traffic whenever possible.
6. Test unit positioning.
 - a) Testing is to be done with the sensors in the wheel paths, 3 feet and 9 feet from the centerline or lane line, for lanes 11 feet to 12 feet wide unless noted otherwise in the contract documents.
 - b) For testing on wider lanes such as ramps and loops, position the driver side sensor 3 feet from the left edge line. If the passenger side sensors is within 1 foot of a longitudinal joint. Adjust the travel path to the right so the sensor is 2 feet from the joint line.
 - c) For testing tapers to and from a full lane, begin or end the section testing when the pavement is either 12 feet or at the full lane width whichever is less.
 - d) Begin collecting profile data for ALR 50 feet before the beginning header from old to new surface and 50 feet beyond the header from new to old surface. Figure 1
 - e) Figure 2 and 3 show examples of how to analyze ALR at obstructions defined in Article 2317.03, B, 2, b of the Standard Specifications.

7. Ensure there is enough room before and after the section to be tested to allow for a 300 foot run-in and run-out area for the profiler before and after the test section according to the manufacturer's recommendations. The run-in allows the accelerometers, lasers, and computer to stabilize before the start of the section. Mark the intended start and stop location of the section and place reflective cones or strips to trigger the auto start/stop sensor on the profiler.
8. Use the event feature to mark on the file any reference points like, side road intersections, roadway signs, maintenance markers, stations markers, and mileposts. In the event of rough segments or ALR, this will help the grinding personnel locate the area to grind. (The as driven stationing from the profiler will rarely match the stationing on the roadway unless the roadway is completely flat with no curves. The longer the run of the profiler, the farther the profiler stationing will be off from the plan stationing.)
9. During the profiler run, use the ignore feature at bridges and bridge approaches to mark areas on the file and exclude the data from the analysis. The profiler still collects data and it can be recovered later during analysis if the key is pressed inadvertently.
10. Label the file so it can be easily found and retrieved later. (Project number, lane, and beginning station in the file name is one way to label)
11. When a segment is corrected by grinding to improve the segment MRI, the entire segment must be retested and a MRI determined to verify that the corrected segment is in specification compliance.

E. Analyzing and Reporting

1. Use the profiler software export function to export an unfiltered "ERD" file.
2. Use the latest version of ProVAL to perform the MRI and ALR analysis on the ERD files.
3. Report results on the Iowa DOT provided Excel spreadsheet (Figure 4). The sheet may be downloaded at http://www.iowadot.gov/Construction_Materials/materials_forms.html. The test report is required on this form for project acceptance.
4. Areas needing correction will be noted by the software on the spreadsheet. For segments that are ground to correct the MRI, show the corrected MRI and mark the box to the left of the segment to show grinding has been completed on that spreadsheet.
5. There are two types of reports:
 - a) **Final.** Used to indicate that the report is being submitted for acceptance.
 - b) **Corrected.** Used to indicate that there was either an error in the original test report or that the section was corrected by grinding and retested.
6. Test report laboratory numbers must be continuous and increasing numerically as each succeeding test is performed. Laboratory numbers shall have a letter added to the end of the original laboratory number for corrected reports (i.e., original report number 01-218L-05, corrected report number 01-218L-05-A).

7. Submit final and corrected reports to the Engineer through DocExpress. If smoothness testing is done after the paving is completed, submit the ProVAL file(s) to DocExpress also. Label the ProVAL file(s) with the project as part of the file name.
8. Keep ProVAL files not submitted to DocExpress until validation of the Contractor test results have been confirmed.
9. An example of a completed report form is shown in Figure 4.

F. Certification

Use a trained and certified person to do the testing, evaluation, and reporting. The certification information is in Materials IM 213.

VALIDATION OF CONTRACTOR TEST RESULTS

In order to use the Contractor test results in the acceptance decision, the results must be validated.

Normally the District Materials Office will perform verification testing within 1 month from receiving final test reports and notification from the Contractor that the pavement is available for testing. The validation tolerances are in Materials IM 216.

When the Contractor test results cannot be validated, the District Materials Office will promptly notify the Contractor and begin the dispute resolution process. Testing disputes arising between the Contracting Agency and the Contractor shall be resolved in a reliable, unbiased manner. This may involve an evaluation performed by the Iowa DOT Central Materials Laboratory. Resolution decisions by the Iowa DOT Central Materials Laboratory will be final.

The District Materials Engineer will select some or all of the following steps for the dispute resolution:

1. Check all numbers and calculations.
2. Review testing procedures.
3. Compare profiles and dates of testing.
4. Check equipment operation, calibrations and tolerances.
5. Perform side-by-side tests.
6. Involve the Central Materials Laboratory.

If the discrepancy cannot be resolved using the steps listed above, or if it is determined that the Contractor's testing is in error, then the Agency test results will be used for the acceptance decision for the project.

**Figure 1. Area of Localized Roughness (ALR) Analysis
at the Beginning of Project
(Same at End of Project)**



Note: The ALR at any point covers profile 12.5' back and 12.5' forward.

Figure 2. ALR Analysis at the Bridges/ Bridge Approaches

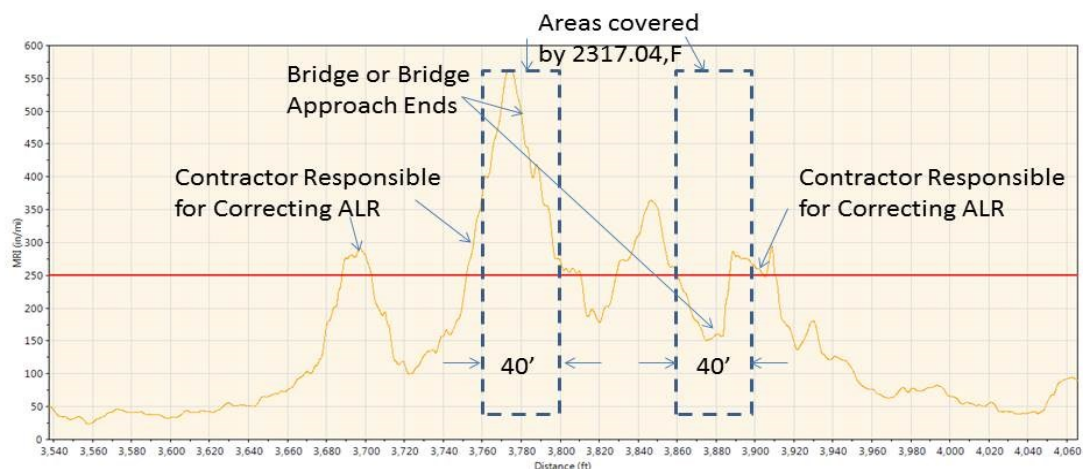
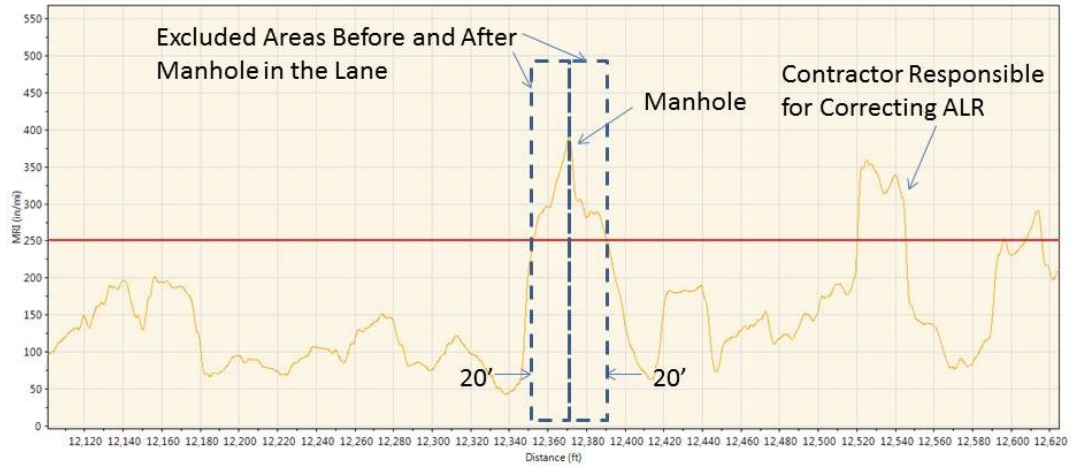


Figure 3. ALR Analysis at the Manholes and Water Valve Boxes



[illegible]